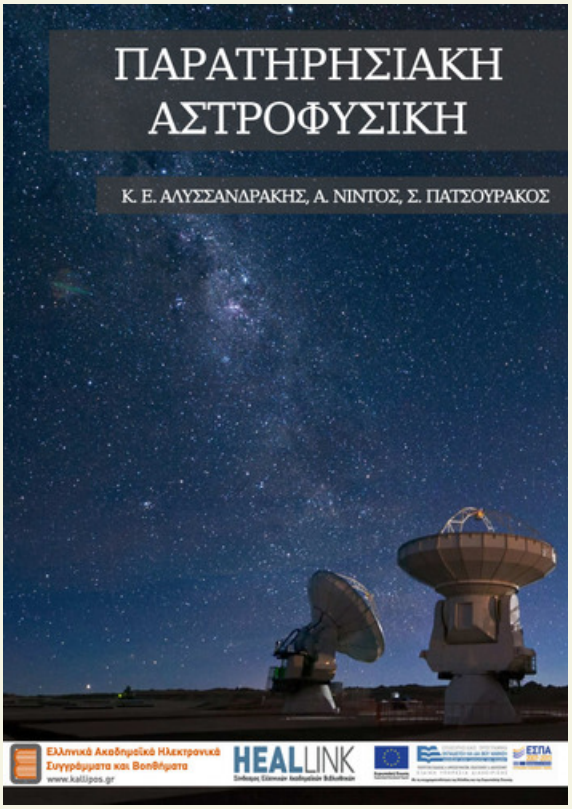

METADATA

Title: Observational Astrophysics

Other Titles: -

Language: Greek

ISBN: 978-960-603-429-9

Subject: NATURAL SCIENCES AND AGRICULTURAL SCIENCES

Keywords: Astrophysical Observation / Atmospheric Absorption / Seeing / Aperture Theory / Telescopes

Bibliographic Reference: Alissandrakis, C., Nintos, A., & Patsourakos, S. (2015). Observational Astrophysics [Undergraduate textbook]. Kallipos, Open Academic Editions. http://dx.doi.org/10.57713/kallipos-486

Abstract

This textbook, at the advanced undergraduate/introductory graduate level, presents the physical principles and the instruments used in astrophysical observations. We start with the presentation of the sources of astrophysical information and the measurable quantities, and we proceed with the discussion of the influence of the terrestrial atmosphere (absorption and seeing) and their treatment. Next, we give an extended presentation of the aperture theory, independent of observing wavelength, and of the influence of the aperture on the quality of observation of point and extended sources. We adopt an approach based on Fourier transforms and discuss both single and composite apertures. Subsequently we discuss optical, infrared, ultraviolet, X-ray and radio telescopes. A discussion of detectors of radiation follows, starting with the physical principles of detection and proceeding to particular devices. Spectroscopy comes next, together with the associated instruments (spectrographs, filters etc), followed by a chapter on the measurement of polarization. We conclude with the measurement of particle radiation (cosmic rays, neutrinos, particles in the interplanetary space) and of the gravitational radiation. The book concludes with four appendices, an extending one discussing some aspects of positional Astronomy (coordinate systems, time, atmospheric refraction, aberration, precession and nutation and catalogs of astronomical objects). Answers to selected exercises, tables, bibliography and cite addresses are also given in appendices.

The Project is funded by the National Development Programme 2021-2025 of the Ministry of Education and Religious Affairs and implemented by the Special Account for Research Funds of the National Technical University of Athens and the Hellenic Academic Libraries Link.